

Drug-induced Telogen Effluvium in a Pediatric Patient due to Error of Transcription

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ABSTRACT

"Errors of transcription" are rarely reported, but may cause significant adverse effects in patients. Here, the authors report the case of a 15-year-old Burmese girl presenting with telogen effluvium after being dispensed the wrong medication due to a pharmacy auto-complete error. (*J Clin Aesthet Dermatol.* 2015;8(8):52–54.)

The introduction of computerized medical management systems (MMS) has revolutionized the healthcare industry. While prior studies have shown that e-prescribing and computerized MMS reduce the number medication errors overall,¹ the introduction of this technology has inadvertently led to new kinds of errors, such as auto-complete and selection errors, that were not possible in the paper age.² Medication errors are important to consider in patients with unusual presentations, especially in patients who do not speak English and may not be able to read their prescription bottles. Here, the authors report the case of a pediatric patient who presented with telogen effluvium suspected to be caused by an "error of transcription" at the pharmacy.

CASE REPORT

A 15-year-old Burmese girl presented to the pediatric dermatology clinic for diffuse and sudden hair loss over the last two months (Figure 1A). As the patient and her parents spoke no English, the entire medical history was obtained through an official interpreter. A detailed history to elucidate the cause of her hair loss revealed the patient did not use any hair products other than a readily available shampoo. She ate a well-balanced diet and did not have heavy menstrual cycles. She denied any recent acute infections or weight loss/gain, intentional or otherwise. She had never been sexually active and denied being pregnant. She denied common stressors in her life including loss of a loved one or pet, bullying/abuse, fight with a friend, school performance, and family turmoil.

She denied any known exposure to heavy metals both through her place of residence in Burma and in the United States and through a careful hobby/occupational history. Her move to the United States, more than six months ago, was seen only as a "good thing" and not a source of strife. In terms of her medication history, the young woman was also being followed by rheumatology for enthesitis-related arthritis; three months prior to the visit, she had been prescribed methotrexate 2.5mg x 8 tabs weekly to help treat the condition.

On physical exam, the patient was a well-nourished appearing female in no apparent sign of distress. Her affect was normal and she smiled and made eye contact throughout the exam. Her scalp was noted to have diffuse, generalized hair loss; there were no signs of erythema, scarring, or scale. A hair pull test was positive, and trichogram revealed hairs in telogen phase. Her eyebrows and eyelashes were normal, and there was no loss of hair noted elsewhere on her body. Her conjunctiva were pink, and her thyroid was of normal size and without nodules. Her dentition was normal. There were no physical signs suggesting bulimia or past abuse, though a full pelvic exam was not performed. She had no appreciable lymphadenopathy.

A careful review of systems revealed worsening joint pain and increasing frequency of urination over several weeks. Knowing the patient had come to pediatric dermatology directly from her rheumatology follow-up appointment, her medical team inquired as to what was being done for her increasing arthralgias. The patient

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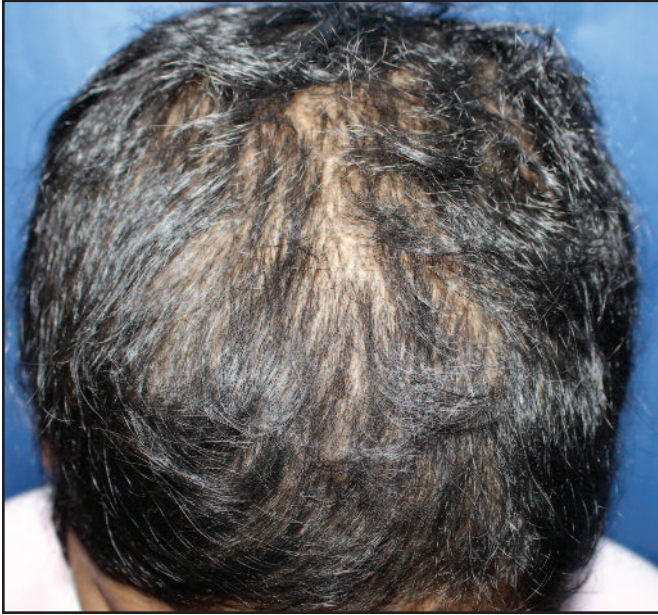


Figure 1A. Diffuse and sudden hair loss consistent with telogen effluvium in a 15-year-old female patient



Figure 1B. Patient at her three-month follow-up appointment demonstrating near-resolution of her telogen effluvium

reported that the dose of her methotrexate had just been increased. Attempts to confirm the precise new dose of methotrexate through the interpreter revealed inconsistencies that prompted the pediatric dermatology team to ask the patient's mother to produce the new prescription from her handbag. Direct visualization of her medications revealed that the patient had been taking "methazolamide 25mg, 8 tabs orally once a week" (Figure 2), instead of the prescribed "methotrexate 2.5mg, 8 tabs orally once a week." The patient and her family were unaware that this was the incorrect medication as they were unfamiliar with the medication and could not read the bottle's instructions, which were in English. Instead, they were using the medication according to the instructions written by their Burmese translator during rheumatology visits.

The pediatric dermatology team first confirmed the prescription for methotrexate had been ordered correctly in the hospital's own electronic health record. Then, they notified the dispensing pharmacy, a nationwide chain, of the error. The next day, a pharmacy supervisor called to report that an investigation into the error had revealed that the dispensing pharmacist had typed the first four letters of methotrexate (i.e., "M-E-T-H") into the pharmacy computer system. The computer system auto-completed to the first alphabetical listing, "methazolamide," and this medication was inadvertently selected. Because the pharmacist did not double check the medication prescribed against the medication dispensed, the incorrect medication was dispensed to the patient.

At her pediatric dermatology follow-up appointment

three months later, it was confirmed that the patient was no longer incorrectly taking methazolamide and, instead, had been started on the correct dose of methotrexate. Her arthralgias had greatly improved, and the increased frequency of urination had resolved. Most notably, her hair loss had resolved, and she demonstrated significant hair regrowth in the affected areas (Figure 1B). Her hair pull test at this time was negative.

DISCUSSION

Telogen effluvium is a disorder of the scalp characterized by thinning or shedding of the hair as a result of too early entry into the telogen phase (the resting phase of the hair follicle). It can be caused by emotional or physical distress, such as illness, childbirth, eating disorders, major surgery, and medications, and it usually appears 2 to 3 months after initiation of the stressful event or medication.³ Methazolamide is a carbonic anhydrase inhibitor used to lower intraocular pressure in patients with glaucoma. The effective therapeutic adult dose varies from 50 to 100mg administered twice or three times daily.⁴ The authors' patient was taking 200mg of this medication once a week, an infrequent dosing schedule, but a potent dosage in a pediatric patient.

While there are no reports in the literature of methazolamide specifically causing telogen effluvium, the timing and type of her hair loss and the resolution of her telogen effluvium with cessation of the medication makes methazolamide a likely culprit. Documented adverse reactions for methazolamide include anaphylaxis, fever, rash (including erythema multiforme, Stevens-Johnson syndrome, toxic epidermal necrolysis), crystalluria, renal

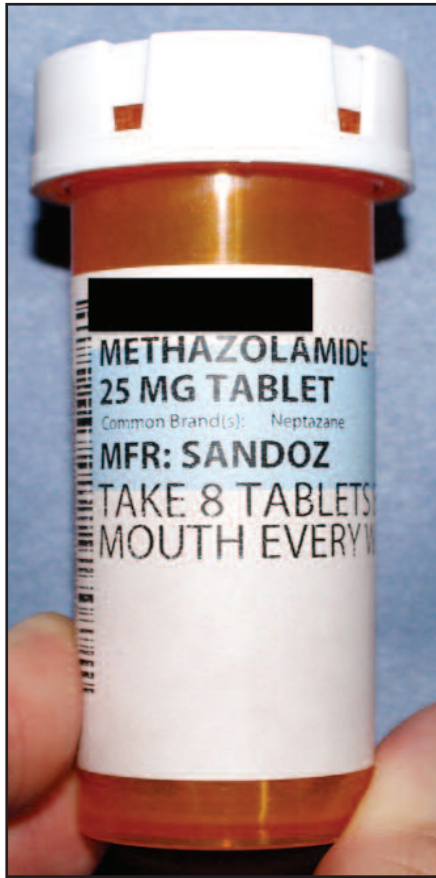


Figure 2. Prescription bottle demonstrating the transcription error made possible by the pharmacy's auto-complete function. The patient had been prescribed, "methotrexate 2.5mg, 8 tabs orally once a week," but was instead dispensed, "methazolamide 25mg, 8 tabs orally once a week." The patient and her family speak only Burmese, thus they were unable to interpret that the dosage was also incorrect ("2.5mg" versus "25mg"), as the Burmese numerical system differs from the English one.

calculus, bone marrow depression, and hematologic aberrations.⁴ Fortunately, the patient's lab work revealed none of these associated abnormalities.

Since the correct medicine was not properly transcribed into the pharmacy computer system, this case exemplifies an "error of transcription." Transcription errors are errors of order communication, missing or wrong information exchange, or misinterpretation or misunderstanding of prescription orders. They occur after the physician prescribes the medication, but before the preparation/dispensing stage (when the medicine is prepared/compounded by the pharmacy).²

Transcription errors are rarely reported in the literature. A study of prescribing errors after the introduction of electronic medical records in two Australian hospitals found that only 2.2 percent of overall site errors occurred in the transcription stage for paper records, and that no transcription errors occurred in the

individuals using the electronic medical record system.² Another study reviewed 602 prescriptions in three community-based practices and found that physician e-prescriptions differed from the medication dispensed by the pharmacy two percent of the time. The majority of these discrepancies were in dosing and duration of the medication, with no reports of the wrong medication given.⁵

The patient and her family were not able to recognize the incorrect medication and dosage because they could not read the English label. Parental English literacy has been shown to play an important role in correct medication administration in children. A randomized trial of limited English-speaking patients receiving either their prescription medicine bottles in English or in their native language found significantly greater prescription understanding, regimen dosing, and regimen consolidation for patients given instructions in their native language.⁶ Another study of Spanish-speaking parents with limited English proficiency found that only 22 percent were able to correctly dose their child's medication.⁷

This case demonstrates a medical error occurring at the transcription stage of prescribing, an under-reported phenomenon. It also illustrates the importance of ensuring a patient's prescription text is in their native language, when possible. Correcting the pharmacy medication management auto-complete program, as well as instituting a mandatory double-checking between pharmaceuticals dispensed and those prescribed, would help eliminate such errors in the future. Fortunately, the dispensing pharmacy has worked with us to address this problem, at least on a local level, and has offered to pay for any expenses incurred by the patient related to this transcription error.

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